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Advertising and the Predation Loop: A Biosemiotic Model

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Abstract The basic premise of biosemiotics as a discipline is that there are elementary processes linking signifying strategies in all forms of animate life. Correspondingly, the discoveries of biosemiotics should, in principle, be capable of revealing new insights about human signification. In the present article, I show that this is in fact the case by constructing a biosemiotic model that links advertising strategies with corresponding structures in animal predation. The methodological framework for this model is the catastrophe theory of René Thom. The end result is a revised understanding of an ostensibly cultural phenomenon that demonstrates its continuity with signalling processes conventionally associated with the natural world.

Keywords Advertising · Predation · Catastrophe theory · René Thom · Biosemiotics

Introduction

At first glance, it would seem that advertising is one of the least likely forms of semiosis to reward a biosemiotic approach. As a practice that "is designed, consciously or unconsciously, to create and strengthen consumer impressions of the brand advertised, so that they will be more likely to buy it, or buy it more often" (White 2000: 6), advertising clearly has a pragmatic agenda that cannot be easily situated in a naturalistic framework. Moreover, even within this pragmatic charter, the characteristic problems and aims of advertising discourse are subject to evolution and development. As might be expected, changes in market structure are one of the primary engines in these developments in how advertising is conducted. At the most general level, this can be seen in the character of present-day advertising, where the globalization of markets has engendered a type of advertising that "plays a key role

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in constituting the geographic boundaries of markets and the internationalization of consumer culture" (Leslie 1995: 402). Concrete evidence for this type of market-driven change can be found readily enough in the emergence of strategies such as 'viral' marketing (Rayport 1996) and so-called 'disruption' techniques (Dru et al. 2002), which are advertising methods that respectively respond to the phenomena of social networking and market consolidation that emerged the 1990s. Finally, changes in the "corporate philosophy" (Wright 2000: 61) of marketing have impacted strongly on advertising, where the moral imperatives associated with issues like environmentalism and social responsibility have had a major influence on the way in which products and services are advertised (Alwitt and Pitts 1996). In light of these assessments of advertising as a historically specific, economically situated phenomenon, it may thus seem that biosemiotics, as a discipline that embraces "all processes that take place in animate nature" (Hoffmeyer 1998: 82), has little to offer the semiotic analysis of advertising discourse. From this perspective, the biosemiotic project is simply too broad to accommodate advertising, which, in all its cultural and historical specificity, is best thought of in anthroposemiotic terms.

While admitting the surface plausibility of these claims, my aim in the present article is to challenge the view that advertising can be understood solely from an anthroposemiotic perspective. Specifically, I will argue that all forms of advertising conceal an elementary morphology that lends itself quite readily to biosemiotic analysis—namely, the structure of animal predation. At the most general level, my motivation in making this claim will be Thomas Sebeok's assertion that "anthroposemiosis is fastened in zoosemiosis, [and] human semiosis is played out predominately in the pre-linguistic, extra-verbal mode" (Sebeok 2001a: 11). Just as Umberto Eco equivalently observes that "in the depths of biological processes lie the elementary mechanisms from which semiosis springs" (Eco 1988: 15), Sebeok here makes the case for relating human sign production to a set of basic dispositions that are not necessarily linguistic in origin. The advantages of this approach are obvious: by situating human signification in a set of basic biological competencies, the prospect emerges of a global semiotics that is sensitive to *all* forms of semiosis, and not just the local variety associated with *Homo sapiens*. Ideally, the broader perspective offered by this global point of view should enrich our understanding of human semiosis by revealing hitherto unrecognised connections between culture and the natural processes that subtend it. While it is only fair to concede that this rapprochement between nature and culture is unlikely to result in any epistemologically admissible science of signification, it is only fair too to recognise that biosemiotics represents a significant advance on those narrow humanisms that, until quite recently, have dominated inquiry in the human and social sciences.

To return to the task at hand, I will pursue this postulated connection between advertising and biosemiotics by making use of René Thom's catastrophist models of biological processes. There are several good reasons for using Thom's work in this connection, but the foremost of these is undoubtedly the fact that, as Alain Boutot observes, Thom's catastrophe theory "struggles against the scattering of knowledge by discovering the fundamental structural unity of Nature itself" (Boutot 1993: 179). In both *Structural Stability and Morphogenesis* (1975) and *Semio Physics* (1990), Thom offers an integrated theory of nature that, on the basis of an elementary set of mathematically-derived forms, charts the finite number of ways in which

discontinuous change can occur in three dimensions of space and one of time. What distinguishes this approach from standard scientific models is the fact that these forms – which correspond to the 'catastrophes' of the theory's title – are autonomous in relation to their material implementation; they are, in Thom's words, "independent of the substrate of the forms and the nature of the forces that create them" (Thom 1975: 8). In essence, the claim here is that there are *a priori* constraints on the ways in which change can occur, and that these constraints can be modelled as a number of elementary morphologies that describe the qualitative behaviour of discontinuous systems. To the extent that Thom is correct in making these claims, it should be clear that his work has a particular application in biological modelling. As the paradigmatic example of a system that alternates between discontinuous states in the form of mutually exclusive behaviours, animate life represents the superlative target for catastrophist analysis. Indeed, as is evident in the work of Christopher Zeeman (1980) and Thom (1975) himself, catastrophe theory has not been slow to take up this challenge, with the models produced covering (albeit controversially) phenomena such the flight-or-fight response in dogs, the swarming of locusts and the cycles of reproduction and ingestion in all forms of organic life.

In what follows, I will take one of these models – as mentioned above, that associated with the predation loop – and show that the morphological structure that it describes offers a compelling formulation of how advertising strategies operate. I will argue, in essence, that the purpose of advertising is to stimulate discontinuous changes in behaviour by the appropriate use of what Thom calls *salient* and *pregnant* forms; and that the interaction between these forms and the subject exhibits the same morphology – the *cusp* catastrophe – as the predation loop. What this should hopefully show is that the type of semiosis specific to advertising is not a local product of market economies, but is instead a reflection of a far more fundamental semiotic tendency on the part of all animate life. To this extent, it is probably worth admitting from the outset that my model of advertising, though biosemiotic in its inspiration, will have its main value when it comes to the understanding of human semiosis. Nevertheless, I am of the conviction that if biosemiotics is to live up to its charter as the study of *all* forms of organic signification, then it is vital that it remains sensitive to those pan-specific signifying strategies that unite *Homo sapiens* with the wider biosphere.

Salience and Pregnance

The first step in developing a biosemiotic model of advertising comes with identifying an appropriate conceptual infrastructure in which the model can be expressed. In the present section, I will do this by exploring Thom's concepts of *salience* and *pregnance*. As both of these concepts feature prominently in Thom's attempt to develop a coherent philosophy of nature in *Semio Physics*, they provide an ideal starting point for biosemiotic modelling. Once I have explored the notions of salience and pregnance and their relevance for advertising, the stage will then be set for the second section, which will offer a mathematical formulation of how both concepts can be integrated with Thom's account of the predation loop.

To begin, as Thom does, with the concept of salience, the simplest formulation that can be put on this idea is that a salient form is any discrete spatiotemporal object

or phenomenon that can be discriminated against a substrate space or background. In Thom's formulation: "I shall call [a] *salient form* any experienced form clearly separate from the continuous background against which it stands out" (Thom 1990: 3).[1] Although this definition appears simple, it gestures towards the basic datum that makes any apprehension of the world possible—the fact of discontinuity. However, the generality of his definition notwithstanding, Thom is careful to distinguish between salient forms and *features*, which lack "the character of autonomy, of individuation, proper to beings perceived as legitimate entities" (Thom 1990: 3). As examples of features, Thom cites sets of isolated points on the plane, as well as non-closed surfaces in 3-dimensional space. On this view, it is evident that the essential characteristic of salient forms is their boundedness or closure, in that it is this trait which distinguishes salient forms from the features that comprise them. In this regard, Thom offers the instructive example of the human body, which, as a salient form, decomposes into hierarchically arranged trees of features like *body* → *head* → *eyeball* → *retina* or *body* → *torso* → *arm* → *hand* → *finger*. In sum, then, what a salient form corresponds to is a collection of features amalgamated into a perceptual or cognitive primitive that displays the qualities of wholeness, individuation and closure.

This preliminary exploration of salience leads us naturally to the second major concept deployed by Thom in *Semio Physics*—that of *pregnance*. Although this concept is difficult to translate precisely into English, the quality of pregnance is present in any situation that impacts on the fundamental biological imperatives of the human or animal subject. As Thom puts it, pregnances are "occult qualities, efficient virtues that emanate from source-forms and invest other salient forms in which they produce visible effects" (Thom 1990: 2). By way of example, Thom nominates as a typical pregnance the attraction exercised on an organism by a potential sexual partner or prey. In his words:

> The recognition of these [sexual and alimentary] forms gives rise to a very ample reaction in the subject: the freeing of hormones, emotive excitement, and behavior designed to attract or repulse the inductive form. I will call such forms *pregnant*, and this specific character of theirs *pregnance*. (Thom 1990: 6)

In essence, then, a pregnant form represents the environmental correlate to those innate, biologically fundamental drives upon whose satisfaction the survival of the organism and its descendents depends. As might be expected, the essentially abstract nature of pregnances considered as things in themselves makes the source forms of paramount importance, in that without them the pregnance has no operational value. Indeed, as Thom points out, this embodiment of a pregnance in a source form manifests itself most clearly in the phenomenon of *supranormal releasers*. What is

[1] Although limitations of space preclude a sustained discussion here, it is worth remarking on the deep similarities linking Thom's account of salience and Roman Jakobson's notion of *markedness* (see Waugh 1976). This latter concept – which has since undergone significant amplification in a variety of fields (see Schleffer [1987], Golston [1996]) – deals with the phonological and semantic markers that nominate one term of a binary opposition as being a local case of the other, more general, term. Thus, in the 'male' vs 'female' opposition, the English suffix '-ess' marks female as a derivative case of the default male category (as in 'lion' vs 'lioness'). In Thom's system, the characteristic of salience can be equivalently seen as a form of perceptual markedness that identifies a form against a more general background.

involved here is when an organism, stimulated by the proximity of a pregnance, comes to prefer an exaggerated source form to a natural one. In this connection, Thom cites the example of a goose choosing to incubate a rugby ball instead of an egg, though one could just as easily make reference to the tendency by most human cultures to artificially augment secondary sexual characteristics. Whatever example one chooses, however, the explanation remains the same: the exaggerated source form, as a more expressive vehicle of the pregnance, exercises considerably greater attraction on the organism than whatever other tokens of the pregnance that may be present in the environment.

Considered together, the concepts of salience and pregnance can be integrated into several interactional schemas, though in the present connection, the most significant is undoubtedly the investment of a salient form by a pregnance to create what Thom terms a *figurative effect*. What happens here is that the field of meaning associated with a given pregnance comes to express itself by way of an unrelated salient form. In Thom's words: "we can look on a pregnance as an invasive fluid spreading through the field of perceived salient forms, the salient form acting as a 'fissure' in reality through which seeps the infiltrating fluid of the pregnance" (Thom 1990: 7). A good example of this – and the one chosen by Thom – is Pavlovian conditioning, where, by way of association and repetition, a salient form comes to embody a fundamental pregnance. Citing the famous dog that Pavlov trained to salivate at the sound of a bell, Thom argues that

> meat, a salient form, is also *pregnant*: it carries an alimentary pregnance. When the association meat → bell ringing has been repeated often enough (and simultaneously *reinforced* by the satisfaction of hunger), the sound of the bell alone will appear to the dog as a salient form rich in alimentary pregnance. (Thom: 1990: 7)

As Thom makes clear here, the energetic motivation for the dog's changed behaviour can be easily understood as deriving from the diversion of an alimentary pregnance from a source form (the meat) to a salient form (the sound of the bell). More generally, Thom offers a formal description of the interaction between pregnances and salient forms when he argues that the investment of a source form by a pregnance admits of a series of transitive displacements. Specifically, if there is a relation linking B, a salient form, to A, a source form, represented by $B \rightarrow A$ (that is, B is the sign of A), then a further term, C, can be added yielding $C \rightarrow B \rightarrow A$. Clearly, in this case, the transitive nature of the displacement means that C can ultimately be construed as a sign of A also, and thus $C \rightarrow A$ holds. From a behaviourist perspective, this situation corresponds to the dog salivating to a stimulus that is associated with the sound of the bell, rather than one directly associated with the meat. However, Thom makes the point that this procedure of transitive displacement has its limits, in that $R(X)$, the function measuring physiological response to a stimulus X, necessarily loses intensity as the stimulus moves further away from the source form.

Now that the concepts of salience and pregnance have been explored, it is worth making a few observations on how they can be used in the analysis of advertising. In this connection, it should be readily apparent that one of the key strategies of advertisers is to construct an association between a salient form – the product – and a

pregnance that this salient form is supposedly invested by. Depending on context, the operative pregnance will vary, though one hardly needs to survey the vast secondary literature on advertising to recognise that alimentary and sexual pregnances are probably the most common. Nevertheless, it is important to recognise too that they are not the only ones. Unlike animals, Thom argues that "Man […] can be invaded by a great number of pregnances: one might say that there is a pregnance attached to every one of his concepts" (Thom 1990: 22), and to this extent, it is evident that there are factors other than the biological to be considered in any detailed analysis of advertising. Indeed, as the work of Jean-Marie Floch (1990) and Varda Langholz-Leymore (1975) indicates, advertising can be usefully understood as a cognitive tool that seeks to mediate between culturally relevant values of near metaphysical significance. This fact notwithstanding, however, it is equally evident that whatever the operative pregnance may be, the structuring morphology will remain the same.

To gain a better sense of how all this fits together, it is worth taking a look at an example. In this connection, Fig. 1 is a black and white reproduction of colour advertisement that was put out in 2007 by the BMW automobile group. As can be readily seen, the pregnance at work here is a sexual one, with the source form that manifests it being obviously enough the human body in a highly sexualised position. What makes the advertisement interesting, however, is the salient form that the pregnance seeks to invest. In this scenario, the salient form in question is the picture of the BMW car covering the face of the female model. This is also augmented by the text 'The ultimate attraction,' which verbally reinforces the pictorial message. A final salient form is offered by the BMW logo in the top right of the frame, though this is likely only present to ensure brand recognition. Thus, in this advertisement, it is quite clear that an unrelated salient form – the BMW car – is, by virtue of spatial contiguity being invested by a sexual pregnance. In essence, the advertisement diverts the relatively utilitarian activity of acquiring a car into the far more fundamental activity of sexual reproduction. On the one hand, this is achieved by inviting the viewer to mimetically identify with the fetishistic desires of the male protagonist; while on the other, the arresting image of the woman's body sanctions the blending of the sexual and utilitarian registers. Clearly, this advertisement is also

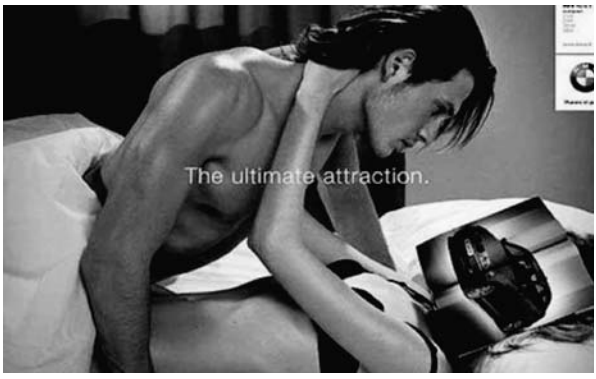

Fig. 1 BMW advertisement

both sexist and biased towards a heterosexual male viewer, though in the latter connection it is worth noting that BMW has a cognate advertisement that addresses the female consumer.

Before moving on to the next section, it is perhaps worth making two final points about the issues raised here. Firstly, it needs to be noted that a more detailed analysis of the above advertisement needs to factor in issues of repetition and context of appearance if it is to systematically account for how advertising operates. As will be seen in the next section, this is of vital importance; though it is left out here as it is not immediately germane to the description of salience and pregnance. Secondly, I have made no effort to integrate salience-pregnance model of advertising with any of the many extant models that are available (see Ambler and Vakratsas [1999] for a comprehensive survey of these). Largely, this is because most current models of advertising are concerned with evaluating the *effectiveness* of advertising, rather than accounting for the mechanisms that underwrite advertising *tout court*. As my aim here is to offer a biosemiotically fundamental interpretation of advertising discourse, there is correspondingly little to be gained by engaging in extended synthetic surveys. With these provisos now made, the time has come to move on to the most important part of the present essay—the coordination of advertising strategies with the predation loop.

Advertising and the Predation Loop

From a theoretical perspective, the salience-pregnance model offers a useful framework for understanding the way in which biological affordances are manipulated in advertising discourse. From a practical point of view, however, it must be conceded that the salience-pregnance model, when considered on its own, performs no explanatory work that is not performed equally effectively by standard stimulus–response-reinforcement models of advertising. In the present section, I will rectify this situation by integrating the salience-pregnance model of advertising with Thom's account of the predation loop. What I will show is that the distribution of energy between the predator, the prey and the inhibitory environment in Thom's model of predation is paralleled in advertising, where the energy is distributed among the consumer, the product and the environmental inertia that inhibits purchase. Following Thom, I will argue that this energy distribution can be modelled using the cusp catastrophe, which is a mathematical function in which small variations in the domain can lead to discontinuous jumps between two stable states. In essence, I will argue that the purpose of advertising is to bring about these small variations with a view to causing the subject to 'jump' from one stable behaviour to another—that is, from *satisfaction* to *acquisitive purchase*. What this will hopefully show is that the mechanisms involved in advertising, far from being purely cultural innovations, are predicated on a fundamental biological morphology.

The first step in demonstrating this commonality between advertising and the predation loop comes with giving an exposition on the cusp catastrophe. As the formal infrastructure of catastrophe theory is quite forbidding, I will omit many of the mathematical details here, though the interested reader is referred to Auer (1980) and Castrigiano and Hayes (1993) for reasonably accessible introductions. In a

nutshell, however, the central idea behind catastrophe theory is that discontinuous changes in dynamic processes are governed by a finite number of regulating figures called catastrophes. The fundamental role played by these catastrophes in organising spatiotemporal processes is adverted to by Thom, when he claims that

> It is possible to say the elementary catastrophes simply provide the basic morphological features of space-time. In this sense, they have a role analogous to the four elementary operations of arithmetic, which, acting on the discontinuous system of the natural integers, allow the elaboration of algebra and the axiomatic production of formal systems. (Thom 1983a: 109)

In this connection, where Thom's major achievement lies is his classification of the seven elementary catastrophes. Each of these is expressed as an polynomial equation of most two variables (x and y) and up to four parameters (u_1, …, u_4). Of the seven catastrophes, the most relevant in the present context is the aforementioned cusp catastrophe, which is a function of a single variable, x, and two parameters, u_1 and u_2. For various mathematically important reasons that need not be developed here, the cusp catastrophe is represented by the function

$$F(x, u_1, u_2) = x^4 - u_1x^2 + u_2x.$$

Essentially what the terms of this function represent are the interactions of x, the internal state of a system, in response to variations in two external control parameters in the form of u_1 and u_2. What makes this function significant can be seen by altering the values taken by the two external parameters. Continuously changing u_2 from a negative to a positive value, for example, yields Fig. 2, where, as can be seen, there are significant qualitative changes in the morphology of the graph of the function for $u_2<0$, $u_2=0$ and $u_2>0$. In this scenario the stable sates of the system are represented by the minimum (or lowest) points on each of the graphs. Thus, in situations where u_2 is either less or greater than 0 the system exists in a stable state. However, where $u_2=0$ it is evident that the two stable states are in competition, in that a small change in the value of u_2 can produce a sudden change where the system 'jumps' into one state or the other. Thom represents this situation graphically by deriving what is termed the *catastrophe surface* of the function, which is obtained by differentiating $F(x, u_1, u_2) = x^4 - u_1x^2 + u_2x$ and graphing the points where it equals 0. This, in turn, yields Fig. 3, where the upper and lower sheets in the foreground of the surface represent the two stable states associated with the cusp

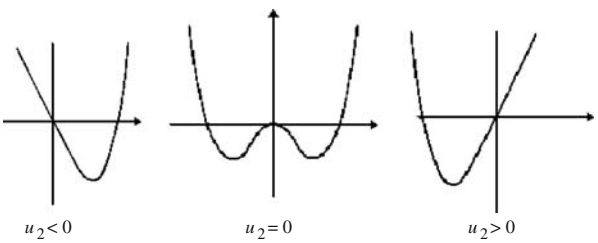

Fig. 2 Discontinuous change in $F(x, u_1, u_2) = x^4 - u_1x^2 + u_2x$ (after Golubitsky 1978: 370)

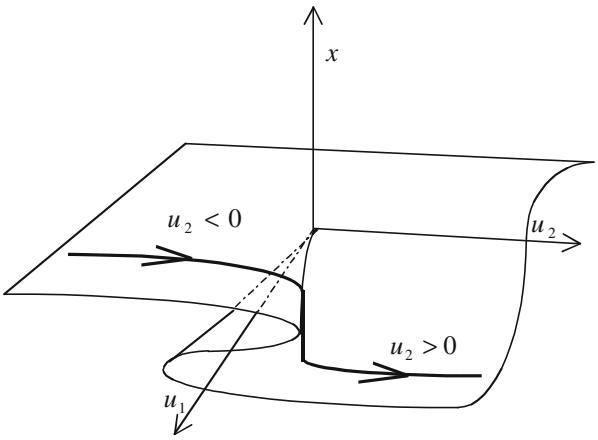

Fig. 3 Catastrophe surface of $F(x, u_1, u_2) = x^4 - u_1x^2 + u_2x$

catastrophe. As can be seen here, when the value of u_2 crosses a critically unstable threshold (the underside of the fold), there is a dramatic change in the value of x, the variable representing the state of the system. Naturally, this large quantitative change can be construed as functionally equivalent to a qualitative change in the system, and from this follows the utility of cusp catastrophe as a modelling device for biphasic systems.

With the basic morphology of the cusp catastrophe now explored, it is possible to move on to its application to the predation loop. In this regard, Thom's claim is that the two states of *sedentary satisfaction* and *animated pursuit* that characterise predatory organic activity can be represented by the biphasic nature of the cusp catastrophe. Specifically, it is possible to assign values to all the relevant variables in the following way:

x = the internal energy reserves of the predator
u_1 = the inhibitory effect of the environment on the pursuit of the prey
u_2 = the attraction value of the prey

From the perspective of the interaction of these variables in the function $F(x, u_1, u_2) = x^4 - u_1x^2 + u_2x$, it is evident that the products $-u_1x^2$ and u_2x express the intuitively obvious fact that both the attraction of the prey and the inhibitory effect of the environment are defined in relation to x, the internal state of the predator. Moreover, because the attractive force of the prey *augments* the internal energy of the predator at the same time that the hostile environment *inhibits* it, they take opposite sign values. In terms of the value taken by x itself – in this case, x^4 – it is evident that perhaps the single most important quantitative factor in the predation cycle is the internal energy reservoir of the predator. Considered as a whole, what the system thus describes is how changes in both the attraction value of the prey (as represented by hunger) and the inhibitory effect of the environment (the ease or difficulty of pursuit) affect the behavioural state of predator. In narrative terms, this means that the system charts how when the relevant values cross critical thresholds (structurally unstable points) the behaviour of the predator catastrophically changes from a sedentary state to an active one, represented by the two sheets of the

catastrophe surface in Fig. 3. To put the whole thing more succinctly, the system describes how the *potential* energy of the predator's internal reserves is transformed into the *kinetic* energy of pursuit and capture. However, it is essential to be aware too that this process is periodic; after an initial state of satisfaction following the capture of the prey, the predator returns once again to its initial position and the cycle begins again. As Thom describes it:

> When the predator (*P*) has recognised an exterior prey (*p*), there exists between (*P*) and (*p*) a kind of symbolic identification, which can be interpreted as the creation in space-time of a handle (in the topological sense) identifying (*P*) and (*p*). From this fact the topology of the space takes on an 'excited' form, and tends by itself, through physico-chemical regulation, to return to normal. This return to normal can be effected in two ways: normally by the capture of the prey by the predator […]; or the handle is destroyed […] and there is a return to the situation anterior to the perception catastrophe [that is, the prey escapes]. (Thom 1983b: 126)

At this point it is worth noting that Thom goes further with this model when he discusses the phenomena of actantial (or agentive) confusion and cognitive alienation, but as these will be dealt with later, their discussion will be foregone for the time being.

Returning to the issue of advertising, the above sketch of the predation loop should immediately register as having an import for the modelling of advertising strategies. As already indicated, both the predation loop and advertising strategies involve the discontinuous transformation of one behavioural state to another on the part of an animate subject. Moreover, in both cases this transformation is achieved in the face of a competition between a desired object and an inhibitory environment. These commonalities notwithstanding, however, there are clearly also important differences between the two processes. For the most part, these cluster around the variable u_2, which nominates the energetic value of the desired object. Specifically, in the predation loop, the desired object corresponds to a natural source form; while in the case of advertising the object is invariably artificial. Thus, advertisers are faced with a problem that evolution has long ago taken care of in the natural world: How does one bring about a discontinuous change in behaviour by way of an object that lacks any 'naturally' desirable features? The most obvious response to this – the reduction in the value of u_1, the inhibitory environment – is blocked by the fact that advertisers have, at best, only a statistical account of their target audience, and are correspondingly incapable of making interventions that will suit every individual economic and social circumstance. (Though it is worth noting that mass marketing strategies like sales and special offers do exploit the possibility of reducing the inhibitory value of u_1.) Instead, the best option is to increase the value of u_2, in the knowledge that for some of the target audience this will be sufficient to bring about the change from sedentary satisfaction to acquisitive purchase. It is precisely at this point that our previous discussion of salience and pregnance comes into effect. By associating the relevant salient form (the advertised product) with a biological pregnance, advertisers make a significant step towards augmenting the attraction value of the product on offer. In this sense, the whole end of advertising is to approximate to the closest possible degree the morphology of the predation loop. What makes this process difficult, of course, is the semantic 'distance' between the

salient form and a biologically sanctioned source form. Thom, it will be remembered makes this point in relation to the physiological response function $R(X)$, which yields lower and lower values the further away the salient form is in associational terms from the source form. It takes no great leap of the imagination to recognise that advertisers respond to this problem by augmenting both the *frequency* and the *intensity* of advertising discourse. In terms of intensity, the advertised product is invariably presented in a manner that exaggerates its desirable features—a practice that clearly owes something to the phenomenon of supranormal releasers. One thinks in this connection of food advertising, where highly stylised latex models of the foodstuff are generally used instead of real examples of the product in question, which lack the visual intensity of shape, size or colour required to trigger a change in the subject's behaviour. Similarly, exaggerated aural effects such as mood-enhancing music and the prototypical sounds associated with a given item (such as food being prepared in a barbecue, say, or the ambient noise of a bar in an advertisement for an alcoholic drink) are used to augment the attractiveness of the product. When it comes to frequency, on the other hand, the aim is to 'shrink' the distance between the salient form and the pregnance in question by a process of repetitive association. In this connection, the most common practice is simply to repeat the relevant advertisement until the association is made, though the practices associated with product placement and corporate branding also seek to reiterate the association between the product and a relevant pregnance (see Pavitt 2000). What emerges from this, then, is that the organising morphology of advertising discourse is implicitly modelled on the predation loop, and that where differences between the two exist, the whole aim of advertising is to reduce these differences.

Before finishing the present section, it is perhaps worth offering a final observation on an intriguing – and unexpected – congruence between Thom's model of the predation loop and the cognate model of advertising outlined above. Specifically, Thom notes that the periodicity in his model animal predation leads to the phenomenon of *actantial confusion*. In his words:

> If we want to arrange things so that the animal can again be in a state of capture of a new prey, we must replace the oriented line L by a closed cycle C which restores the organism to its original state, a requirement of the periodicity of actions. Such a closed cycle must necessarily be centered on the origin, the organizing center of the catastrophe. However, if we lift this closed cycle to the space of internal variables we find that […] the predator becomes its prey. Thus the periodicity of the action implies an identification between the predator and prey, *a confusion of actants*. (Thom 1975: 298)

Behind this somewhat obscure formulation lies a very profound point. In essence, Thom is offering an explanation, on *a priori* mathematical grounds, of the non-identity of the acquisitive consciousness with itself. For Thom, the confusion between predator and prey in the cusp model can be explained in terms of the predator's mind being "dominated, alienated by the image of its prey" (Thom 1975: 299). The hungry predator, seeking its prey, clearly has a mental image of this prey, and this image, as the focus of the predator's actions, makes the predator discontinuous in relation to itself. It is only when an external correlate – the actual prey – is encountered that this self-alienation is overcome and the predator is

restored to psychic wholeness. For Thom, this equivocation between roles offers a possible explanation for how sentience emerged. As he puts it:

> We can suppose that the spatiotemporal continuity of the organism […] is the very basis of the unity of the organism. However, if we extend this requirement to the "semantic spaces" describing the internal properties of an organism, we might easily encounter situations that contradict this requirement of spatiotemporal connectivity. It could be that the essential function of the mind and cerebral organization is to overcome this contradiction. (Thom 1975: 299)

It is very tempting at this point to extend this link between acquisitive appropriation and mental animation to the general fact of symbolic activity in human culture, though limitations of space unfortunately preclude this here. (The interested reader is referred to Carney [2008] for a discussion of these issues in the context of Marcel Mauss's and Georges Dumézil's work.) Instead, the immediate imperative is to look at how the notion of actantial confusion manifests itself in advertising, as it surely must if the contentions of the present essay have any value.

In this regard, a striking parallel emerges between the concept of *commodity fetishism* as it is articulated by Marxist and neo-Marxist thought and the self-alienation implicit in the cusp catastrophe model of advertising. In one of his more penetrating analyses, Marx characterises commodity fetishism as the overcoding of the content of social relations with the form of material relations. In his words: "the relations connecting the labour of one individual with the rest appear, not as direct social relations between individuals at work, but as what they really are, material relations between persons and social relations between things" (Marx 1999: 73). This contention is echoed by Georg Lukàcs when he equivalently asserts that "a relation between people takes on the character of a thing, and thus acquires a 'phantom objectivity'" (Lukàcs 1971: 83). In both accounts, it is evident that the reciprocal substitution of material for interpersonal relations accords commodities a social value that extends far beyond any utilitarian purpose. On the account offered here, this value is explained by the confusion of actants that obtains when salient forms are associated with biological pregnances in advertising. Just as the predator 'becomes' its prey in the predation loop, so too does the subject 'become' the product when successfully targeted by marketing. As the artificially contrived bearer of a biological pregnance, the commodity enters into a semantic identity with the consumer who desires it, and from this follows the fetishization of commodities as indexes of social value for their possessors. In this sense, the phenomenon of social alienation in market societies can be interpreted as having its basis in the biosemiotic morphology of predation, though this contention obviously needs more development than can be offered here.

Conclusion

As indicated in the introduction, the purpose of the present essay is to delineate how one example of human signification – advertising – can be understood from a biosemiotic perspective. The central contention in this regard is that there is a fundamental continuity linking anthroposemiotic and biosemiotic phenomena, or, to

use Thom's formulation, that "when we analyse symbolism into its elementary mechanisms, we do not find any which do not figure either in inanimate matter, or in the humblest forms of life" (Thom 1983c: 261). Hopefully, the achieved results go some distance towards vindicating this claim, even if their partial nature precludes any absolute coordination of the two levels. Nevertheless, even this partial correlation admits of the further speculations that I will develop here concerning the material covered in the preceding pages.

In terms of concrete results, it is perhaps not saying too much to claim my efforts have provided a relatively succinct model of their target phenomenon—the semiosis peculiar to advertising. Admittedly, constructing a mathematical model of advertising is of dubious value when one considers the uses to which such a model could be put, but the description offered here does at least have the merit of being empirically testable. I do not wish to underestimate the practical difficulties that would attend any such test, but once a basic metric for the values taken x, u_1 and u_2 is established, there is no reason in principle why such a test should not succeed in confirming or disconfirming the model.

When it comes to my methodological framework, any success I have enjoyed in the present endeavour should illustrate the value of Thom's catastrophist models in the description of biosemiotic processes. Quite apart from the controversy that has sometimes attended applications of Thom's work in the physical sciences (see Gardner 1978), even within the semiotics community Thom's contribution has sometimes been uncharitably sidelined as being "in a minor key" (Sebeok 2001b: 38). This assessment displays little appreciation of the framework that Thom offers for the integration of semiosis with natural processes. Even beyond semiotics, it is likely that the holistic model of nature offered by Thom offers a valuable complement to the work of figures such as Stanley Salthe (2007) and Stuart Kauffman (1993), who have for many years convincingly argued that the diachronic explanations of neo-Darwinism stand in dire need of a morphological supplement. Ultimately, by offering an account of nature that recognises the role played by regulatory forms, Thom identifies the basic imperatives and regularities that made sign production such a valuable innovation in the development of life. Indeed, as Barbieri (2003) suggests, it may well be the case that sign production is itself the fundamental mechanism upon which the propagation of life hinges. In view of these deep connections linking semiosis with life processes, it would thus seem that Thom's work provides an indispensable point of departure for the many forms that semiotic inquiry has taken and continues to take.

At the most general level, however, the demonstration of a continuity between advertising and the predation loop gestures towards the importance of the biosemiotic paradigm as a unifying forum for the natural and the human sciences. In particular, my results strikingly bear out Claude Lévi-Strauss's prescient observations on the connections between nature and culture when he notes that

> To understand culture in its essence, we have to trace it back to its source and run counter to its forward trend, to retie all the broken threads by seeking out their loose ends in other animal and even vegetable families. Ultimately we shall perhaps discover that the interrelationship between nature and culture does not favour culture to the extent of being hierarchically superimposed on nature

> and irreducible to it. Rather it takes the form of a synthetic duplication of mechanisms already in existence but which the animal kingdom shows only in disjointed form. (Lévi-Strauss 1969: xxx)

In advertising we see precisely what Lévi-Strauss predicts here: the cultural duplication and coordination of elementary mechanisms that exist in separate form in the natural world. Necessarily, this counters what Lévi-Strauss elsewhere calls the "growing stupidity of man in front himself" (Lévi-Strauss 1973: 280), or the anthropocentric attitude that cites the determinations of human culture as the arbiter of every form of truth. To be sure, these ideas are very deep, but it is equally obvious that they have an important bearing on the contemporary situation, where the interactions between humanity and the wider environment have begun to assume the proportions of a global catastrophe.

To close, it is perhaps worth finally suggesting that if biosemiotics is to live up to its charter as a global framework for the study of life, then it is imperative that it produce concrete results rather than simply articulate a laudable worldview. As a relatively new discipline, it has obviously not yet had a chance to demonstrate its utility in this regard, but early results indicate that biosemiotics has at least the potential to generate a dialogue between otherwise disconnected areas of knowledge. Correspondingly, if the present essay has made some small contribution to this dialogue, then it has achieved its purpose as an exercise in biosemiotic modelling.

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